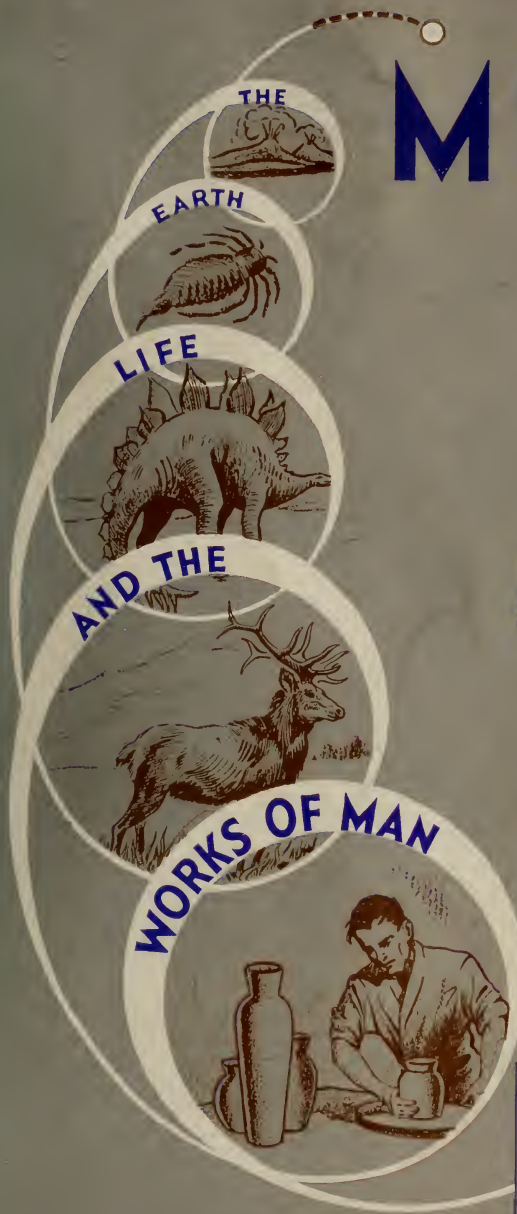


# ROYAL ONTARIO MUSEUM



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ROYAL ONTARIO MUSEUM

THE ROYAL ONTARIO MUSEUM

THE EARTH, LIFE  
*AND THE*  
WORKS OF MAN

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## *Preface*

WHEREAS most types of education depend upon the use of words, the function of a museum is to teach with objects. The museum as a whole is a book, the galleries are chapters, the individual specimens are words.

The theme of this Museum Book is a magnificent one. To this book there is no better introduction than the words "The Record of Nature" and "Arts of Man" which are inscribed beside the front door. Its subject falls into three main sections:

I. The earth itself, its structure, and the rocks and minerals of which it is made.

II. Life, from the primitive fossil forms of early times, to the more highly developed types of today.

III. The arts of man, from the stone tools of our early ancestors up to the industrial revolution.

Each object has been chosen to show some relevant point in this framework; each must be studied in relation to other specimens; each must be labelled and preserved. These are the responsibilities of the scientific staff whose work goes on in the offices and work shops. In the galleries, the exhibits themselves illustrate nature and man through the ages. The following pages are intended to help the visitor to understand the story.



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## I. THE EARTH

THE most fundamental of all studies is that of the earth itself, and one of the three main divisions of this Museum Book deals with the rocks and minerals which comprise its crust. The whole surface of the world is, therefore, the subject of the main floor galleries of the east wing, a subject so vast that each specimen is a minute sample of the types or classes which it represents.

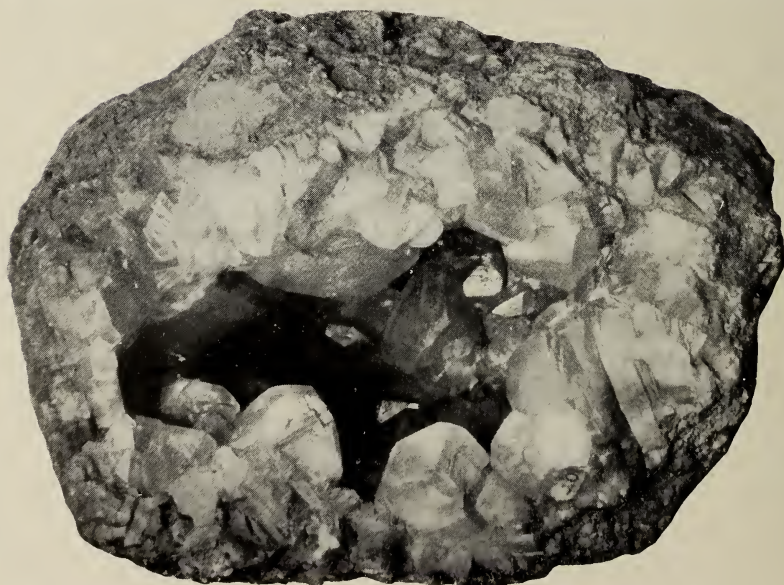
### MINERALOGY

Minerals are inorganic substances of natural occurrence which are made up of one or more chemical elements. As with animals and plants, they have features by which they may be recognized. The major points of identification of a mineral are its shape, the manner in which it breaks, hardness, specific gravity, lustre, colour, and the colour of its powder. These features are present in all minerals; some, moreover, have such distinguishing characteristics as magnetism, taste, and odour. Near the centre of the west wall of the mineral gallery is an exhibit of specimens illustrating these properties.

Minerals are formed in a variety of ways. Some crystallize from the molten condition, others crystallize out of solution, while still others crystallize directly from vapour. Under favourable conditions, many minerals take on a geometric appearance called "crystal habit" which is different for each mineral. To illustrate these features, two wall cases on the west wall of the gallery are devoted to specimens formed under different conditions and showing many of the diverse shapes displayed by minerals. The best crystals are often found in caves of varying size where they have had the opportunity for free growth. Near the north-west corner, there is a reconstruction of a large crystal cave which may be viewed through an opening in the wall. Actual crystals, one weighing nearly five hundred pounds, are



Group of Hexagonal Crystal



A Crystal Cave

used in this exhibit. The apparent size of the cave is increased by the use of two mirrors.

There have been a number of attempts to classify minerals according to various common properties. The one which has been accepted by mineralogists throughout the world is known as the Dana System. This system classifies minerals on the basis of their chemistry. Thus we have the classes of the elements—sulphides, oxides, carbonates, silicates, and others. This arrangement does not group all the minerals of one element together. Copper, for example, occurs as an element, as sulphides, as an oxide, as carbonates, as a silicate, and also in other forms.

The largest collection in the mineral gallery is the systematic collection, which is one of the most complete on the continent and contains all but the rarest minerals. It is displayed in table cases, in groups of six, occupying the centre portions of the east and west sections of the gallery. Spaced between these groups are high cases



Cubic Crystals, Halite (Common Salt), Wieliczka, Poland

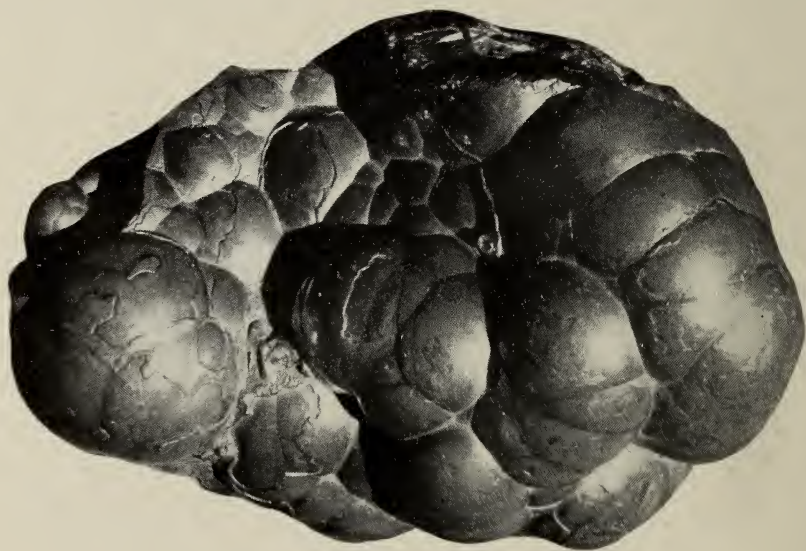


containing larger specimens. Still larger specimens are placed in special bronze cases just inside the entrance to the gallery, in special wall cabinets, and beneath the table cases along the walls. Of necessity, that portion of the collection which is displayed in the table cases is accompanied by very little explanation, but in the high cases, and the special exhibits, each specimen has an explanatory label.

In order to emphasize the mineral wealth of Canada, a systematic collection containing nearly all known Canadian minerals is displayed in cases on the east wall. A special exhibit of Ontario minerals which have been mined for their metallic content or for their use in the arts is shown in four bronze cases along the central aisle. The ornamental stones of Ontario are displayed in a similar case near the south end of the centre aisle.

Of much interest to visitors is the collection of gems displayed in eleven small cases located along the centre aisle of the gallery and in two similar cases flanking the entrance. Of particular interest are the Leonard Collection of precious gems, the collection of Canadian semi-precious stones, and a collection of synthetic gems.

Minerals occur in definite associations; where one is found, another is likely to be present. This mineral association, or paragenesis,



Kidney Iron Ore



Canadian Semi-Precious Gems: Rose Quartz—the Mineral  
and Some Finished Objects

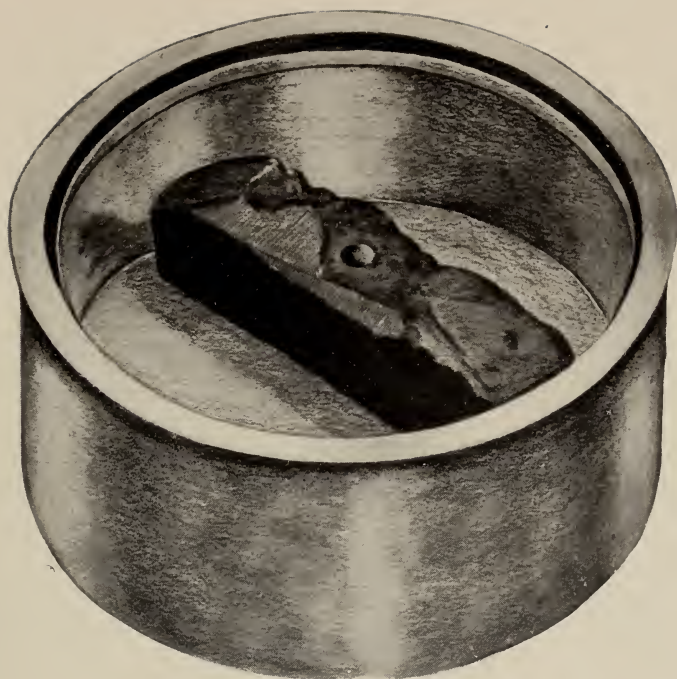
is illustrated by twelve groups displayed in a number of table cases situated along the east and west walls.

Another branch of mineralogy deals with material from beyond the earth. Should two suns or planets collide when hurtling through space, the fragments are thrown in all directions and some may enter our atmosphere. Heated by friction, such a fragment gives off light and becomes a "shooting star." If it lands on our earth, and is found, it furnishes evidence of the nature of the interior of the heavenly body from which it came. These meteorites, as they are called, are made up of minerals, some of them similar to those found on the surface of our earth, others similar to what we believe are located in its interior. A small but representative collection of meteorites is displayed in a large table case on the east wall near the front of the gallery.

An attractive quality of many minerals is colour. A special case located in the centre aisle near the entrance shows their wide colour range. Another feature of some minerals is the colour which becomes apparent when exposed to ultra-violet light. This property is known



Meteorite, Thurlow, B.C.



Primitive Compass

as fluorescence and is often most striking and beautiful. A spectacular display is located next to the colour case in the centre aisle. These two exhibits are a never-ending delight to visitors.

A further characteristic of certain minerals is magnetism. In fact, lodestone possesses this quality to such an extent that it will act as a magnet. A mammoth compass in the north-east corner of the gallery illustrates this property. It consists of a long mass of lodestone in a bronze tub which floats in water within an outer tub. It is one of the most popular exhibits in the gallery.

Minerals are found in the rocks of the earth's crust, and therefore mineralogy and geology are closely related. Near the south end of the gallery is a systematic collection illustrating the three main types of rocks, namely, igneous, sedimentary, and metamorphic. A few fine specimens of rocks, too large to be exhibited in the systematic collection, are arranged about the gallery and under the table cases along the walls.



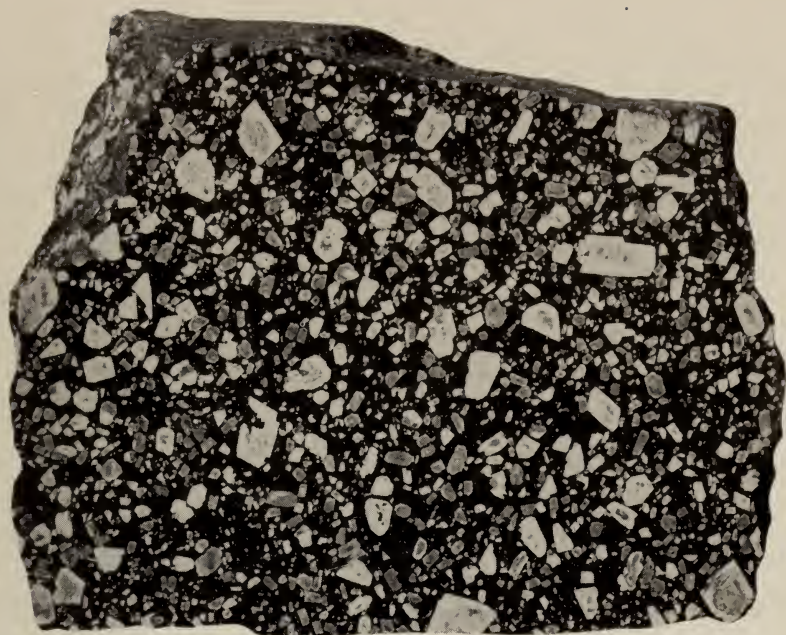
## GEOLOGY

The earth's crust has been a couple of billion years in reaching its present condition. Volcanoes have poured floods of molten lava over the surface to crystallize into solid layers of rock. They have also scattered around great quantities of dust and rock fragments, resulting from solid rock being blown to bits by violent natural explosions. Large masses of hot liquid rock have been forced up into the crust from great depths to solidify on cooling into such rocks as granite and diabase. From these great bodies of hot liquid rock, deep in the crust, have escaped water and gases bearing metals towards the surface in solution. The solutions, when cooled, deposited ores such as those of gold, silver, and copper. In this manner the basis for our continent was laid, being composed at first mainly of igneous rocks.

These early-formed igneous rocks were attacked by weathering and were broken down physically and chemically. Some materials were soluble in water and these were carried away to the sea to form salts in the sea water, like common salt. Clay was formed and it was washed away to be deposited on the sea bottom or in lakes as mud which became compressed into shale. Pebbles were also deposited to form conglomerate, and hard grains of quartz formed sand that became compressed into sandstone. Countless marine animals made shells out of calcium carbonate extracted from sea water. On the death of the animals the shells were left on the ocean bottom in thick layers which became compressed and cemented into limestone. These rocks are called sedimentary rocks because they were formed from sediments, and stratified rocks because they are in layers or strata.

The igneous and sedimentary rocks at various times became squeezed and wrinkled up into mountains or heated by igneous rocks, and they were changed to what are called metamorphic rocks. Some limestones, for example, were changed to marbles, some shales to slates, and granites to gneiss. Examples of all these features may be seen in the west gallery.

These tremendous disturbances in the earth's crust are partly illustrated in the west gallery, by actual sections. Just inside the door there is a column of stratified rocks: sandstone, shale, and limestone taken from the Niagara Escarpment near Grimsby and showing the natural arrangement of the rocks in layers. Most of the stone that was used in the construction of the Museum building came from



Porphyry, Matachewan, Ont.

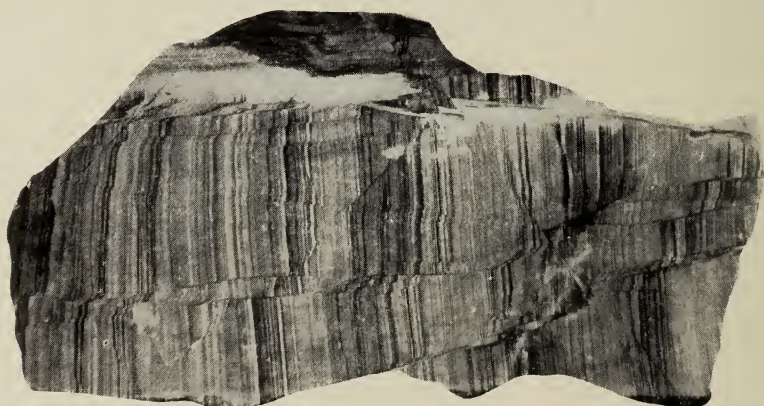
the Escarpment, and nearby is a case containing examples of all the varieties, all but one of them from Ontario. A model of Niagara Falls shows how the river has cut its deep gorge below the falls and how the falls are slowly retreating up the river towards Lake Erie at the rate of over three feet a year. Cases of gem stones, natural and artificial, illustrate the variety of such stones, and one of them shows how the beautiful fire opal develops by petrifying wood in roots and stems of trees.

A tall exhibit against the west wall shows a remarkable section of glacial deposits taken from the brickyard quarry on the Don River. This section of rocks shows that glaciers invaded the Toronto region at least three times and left boulders and mud scattered around. Between the periods when the ice was here there were large lakes covering the region and in them mud and sand were deposited with fossils of trees and animals, some of which lived in a climate warmer

than ours at present. All the events illustrated by this exhibit occurred within about the last million years, a short time geologically speaking. In other cases may be seen the most complete set of specimens of glacial deposits in existence.

Thick glaciers swept down from the north and north-east over southern Canada at least four times in the last Ice Age. They smoothed off rocks and scratched and grooved them. They roughly rounded boulders and pebbles by rolling and grinding them against one another; good illustrations of these features may be seen in the gallery. Paintings by the late Professor Coleman of glaciers and other geological features are on the walls.

Another aspect of geology is the preparation of maps to show the rocks of an area and their structure. A relief map of the Toronto-Niagara area shows the Lake Ontario basin as it would look if there were no water in it, also the shore line of Lake Iroquois, the ancient lake that was much bigger than Lake Ontario and of which the old shore line runs through Toronto, one portion of it being the hill on Avenue Road half a mile north of the Museum. This map also shows that if we bore down about a thousand feet through the glacial drift and the nearly horizontal stratified rocks we find ancient metamorphic rocks like those in eastern Ontario or in Muskoka. On the wall of this gallery is a copy of William Smith's famous first geological map of England and Wales.



Beds of Sandstone Faulted by Disturbances in the Earth's Crust



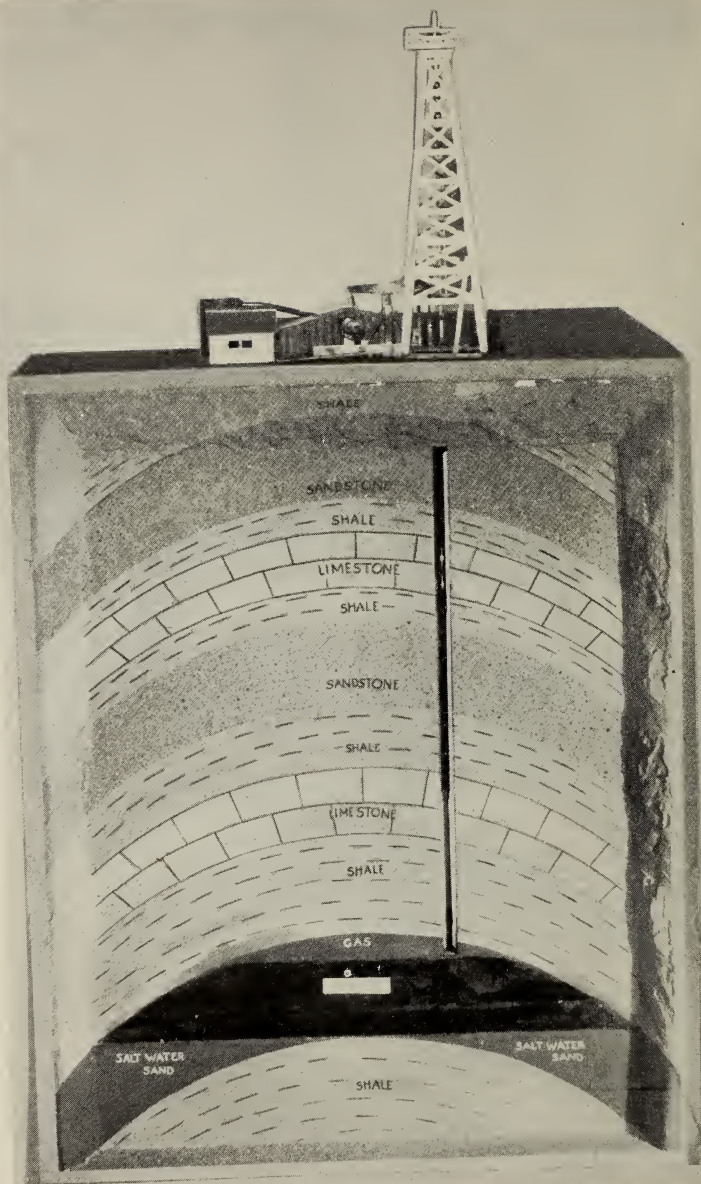


Slab of Sandstone Smoothed and Scratched by the Glacier

An important branch of geology is illustrated by models of oil wells which show how oil occurs and is extracted from the ground, and exhibits show the great variety of oils and their products. Nearby a large variety of coals may be seen, together with products obtained from coal and oil shales. Coal may even be seen as it appears under the microscope in thin sections. A large column of coal shows what a seam over seven feet thick is like from top to bottom. This was cut out of a seam lying away below the sea in Cape Breton Island. Another model shows an asbestos mine and specimens show the woolly fibrous asbestos as it comes in veins in the rock. Many people find it difficult to believe that this is really a mineral.

In this gallery are a number of specimens of unusual interest, including a slice of the Dresden meteorite that fell in 1939 in Kent County, Ontario. Another case holds a great variety of concretions, peculiar bodies of different mineral composition that grow naturally in rocks, and there are ornamental stones of great variety and a wonderful collection of marbles from various parts of the world.

Our civilization has advanced with scientific discoveries and



Working Model of an Oil Well

industrial developments. Metals, along with coal and oil, have played the major role in this advancement: in improvements in our scale of living, reduction of manual labour, in travel facilities, and domestic comfort. Much attention has therefore been given to the sources of the metals and their utilization.

The east gallery contains the ores of practically all metals—gold, silver, iron, copper, nickel, lead, tin, platinum, tantalum, etc.—and models of mines, such as the Dome and Hollinger. Not only the ore minerals themselves are exhibited but miniature ore bodies, like veins. Huge blocks of ore illustrate how some of the ores occur in large masses. A relief model and sections show the famous nickel field near Sudbury, Ontario, which is now supplying about 85 per cent of the world's nickel, a metal of the greatest importance in the manufacture of equipment for war and peace. It is also the world's largest producer of platinum and palladium and Canada's most important source of copper. Specimens of the different ores are on display



Hard Coal



The silver and cobalt specimens from the Cobalt district, Ontario, form one of the special exhibits. The Cobalt field was at one time the fourth largest among the silver fields of the world, and the richest in cobalt, a metal which has sprung into great prominence in recent years. Cobalt, when mixed with chromium, molybdenum, iron, and other metals, makes alloys which have peculiar properties. All are exceedingly hard and some remain hard even when red hot, a characteristic which has greatly improved machine-shop practice. Another important collection of silver specimens comes from Great Bear Lake where this metal is found with pitchblende from which radium is extracted. Some of this ore is worth thousands of dollars a ton. It is concentrated and shipped to Port Hope, Ontario, where the radium is extracted for medicinal and other purposes. The radium in this ore is so strong that it will affect a photographic plate and take a picture in a dark room.

There are some strange ore deposits in the world. One of these is found in Greenland, where cryolite occurs. This mineral is sometimes called "ice-stone" because it looks like ice. It was the first mineral



Asbestos Veins in Rock, Thedford, Ont.



from which the light, and very important, metal aluminium was extracted in commercial quantities. This metal is now mostly obtained from bauxite, specimens of which are also seen nearby. The deposit of cryolite in Greenland is the only one of importance in the world and the mineral is still used in large quantities in making aluminium in electric furnaces. A very complete series of the minerals and rocks from this strange deposit may be seen in a case along the east wall.

The richness of the gold, silver, nickel, and other metal deposits of Ontario, Canada and some foreign countries may be gathered from a visit to the east gallery, and some idea of the importance of these resources may be obtained.

## II. LIFE

### PALAEONTOLOGY

SECTION II of our Museum Book deals with Life through the Ages, that long pageant of living things whose progress has culminated in the animals with which we are now familiar. Much of the story is based upon the fossilized remains of primitive organisms that have led up to life as we know it today. We shall begin, therefore, with palaeontology, the history of ancient life, as displayed in the galleries of the second floor, east wing.

Ancient history for most of us begins with Greece and Rome, with China, or with Mesopotamia and Egypt. Though these civilizations flourished hundreds of even several thousands of years ago, they are in reality, very young when judged by nature's standards.

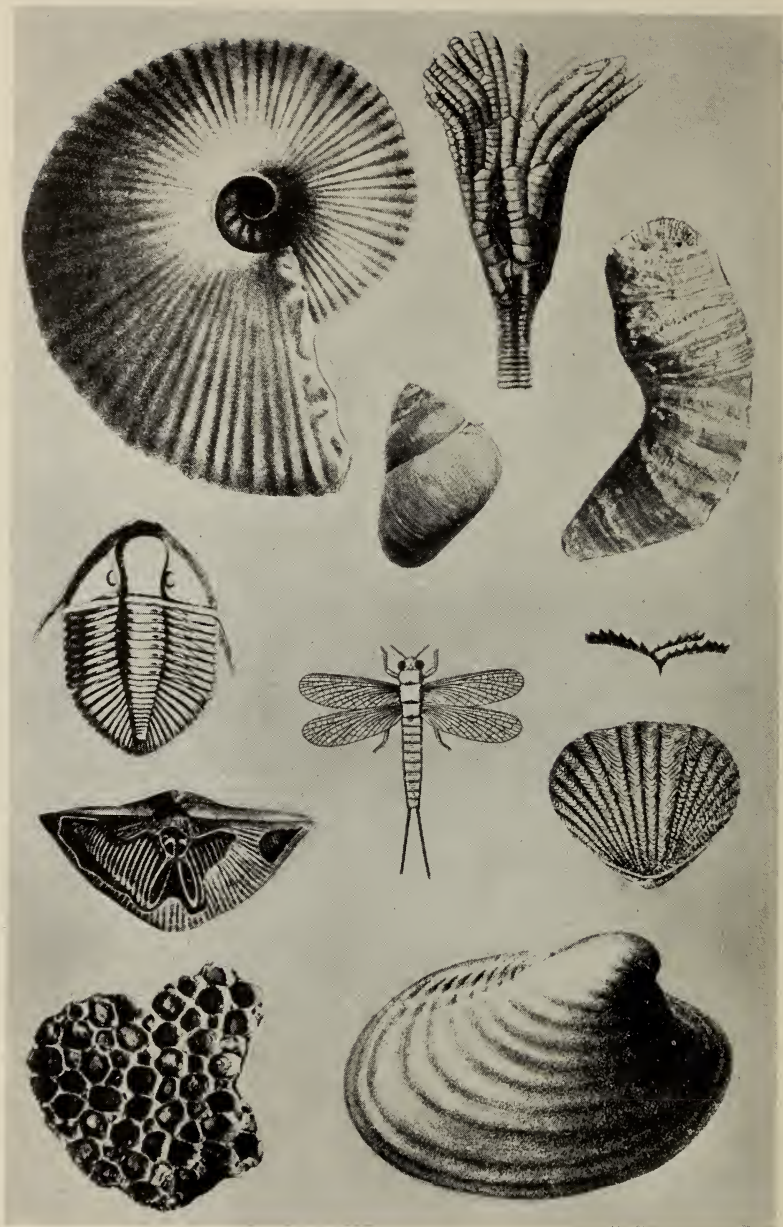
Long before earliest man appeared there lived multitudes of primitive organisms that left neither written language nor inscribed tablets to tell their simple story. These were the animals that inhabited the ancient seas and lands, known now only by their fossilized remains buried in the rocks. Fossils are to the palaeontologist what prehistoric implements are to the archaeologist, or ancient documents to the historian. They represent the "printing" on the rock pages of Nature's magnificent history book.

The simplest of all life is thought to have had its beginnings in the primary oceans, soon after the formation of the earth's crust. These earliest forms consisted of soft, unicellular, jelly-like animals, and primitive sea plants, whose composition rendered their fossilization impossible. And so there is no record of these very ancient types, which existed from two billion to five hundred million years ago.

The earliest organisms known to us date back to this latter period. They belong chiefly to the invertebrates, that is, animals without a backbone, commonly classed as shellfish. They lived, for the most



Prehistoric Land and Seascap



Various Fossil Invertebrates



part, in the ancient seas which often covered vastly different areas than do the seas today. Many of the shellfish, upon dying, became buried in the sediments (muds, sands, and limy oozes) that accumulated on the sea floor. When the seas retreated, as they did from time to time owing to changes in level of the earth's crust, these sediments became hardened into rocks. In such rocks may now be found the fossilized remains of many primitive organisms.

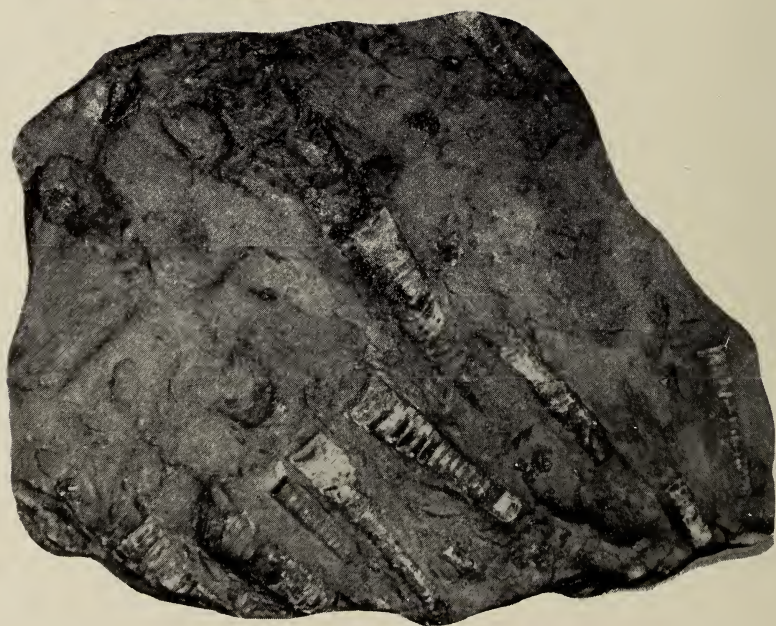
The fossil invertebrates are exhibited in the east and west galleries situated at the south end of the second floor of the east wing. In order to appreciate the various groups of invertebrates in biological and geological sequence, one should enter first the east gallery where may be seen a series of alcoves dealing respectively with the protozoa, sponges, graptolites, stromatoporoids, corals, cystids, blastoids, sea-lilies, starfish, sea urchins, and bryozoa. Then entering the west gallery from the south end one may complete the circuit with the brachiopoda, mollusca (including the clams, snails, nautiloids, and ammonites), and arthropoda. Along the latter group are featured, in exquisite variety and profusion, the trilobites, eurypterids, and insects.

In this gallery, too, may be seen a series of fossil plants ranging in kind from primitive seaweeds to trees of more modern relationships. Conspicuous among the collection are the remains of fern-like plants, horse-tails, and giant club-mosses, which flourished in widespread swamps in eastern North America during the Coal Age, nearly three hundred million years ago. The delicate fronds of the tree-like ferns are among the most beautiful and convincing of fossils.

In addition to the material displayed in the alcoves an extensive collection of typical Canadian rocks and fossils is exhibited in chronological order along the west wall of the east gallery.

An especially interesting series of fifteen cases is arranged along the east wall of the west gallery. Among these are paintings of six prehistoric landscapes. Associated with the landscapes are diagrammatic representations of the sea life of the particular geological period pictured. The models of the shellfish and seaweeds used in each of the seascapes are based upon actual fossils that may be seen in the accompanying cases.

Lastly an elaborate series of paintings decorate the walls of these two galleries. These murals illustrate the changing history of the earth through three billion years.

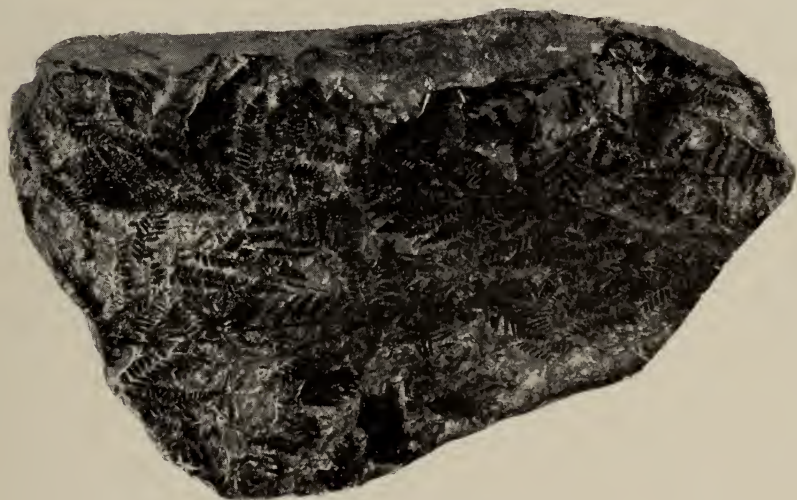


Fossil Shells in Rock

Across the rotunda at the north end of the same floor, fossil animals with backbones, the vertebrates, are assembled in two galleries. Vertebrates include fishes, amphibians, reptiles, birds, and mammals. In order to see the fossil representatives of this great biological subdivision systematically, one should enter by the right hand archway. Most of the exhibits in this gallery represent the remarkable extinct reptiles known as dinosaurs, meaning "terrible reptiles," that lived along the borders of an inland sea which covered Alberta seventy-five million years ago. They are perhaps the most spectacular fossil animals of any age. Remains of this group have been found in all continents. The collection in this gallery is one of the finest in existence.

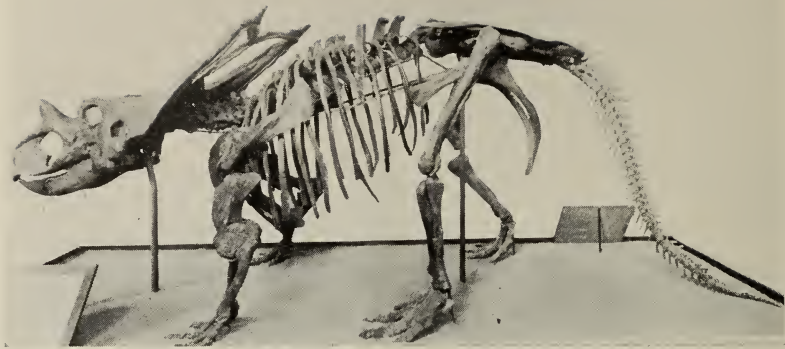
The first group of specimens, popularly known as "duck-billed dinosaurs" because of the shape of the snout, is represented by many splendid and varied examples. Their teeth show that they were plant-eaters.

In the centre of the floor are the horned dinosaurs. Unlike the duck-billed forms, members of the latter group are always quadrupeds. On the east wall nearby is the skeleton of a giant sea-lizard that lived in the State of Kansas when it was covered by water.



Coal Age Fern Impressions





Horned Dinosaur

The flesh-eating dinosaurs, with their ridiculously small front legs, and sharp dagger-like teeth, are represented by two skeletons located at the north end of this gallery. In addition is shown the cast of a head of the largest and fiercest of all the carnivorous dinosaurs, *Tyrannosaurus rex*, the king of the tyrant reptiles. The original of this specimen came from Montana. Mounted on the east wall, not far from this group, is a very fine skeleton of a delicately built bird-like dinosaur. These animals, which somewhat resemble an ostrich in form, were unique as reptiles in that they had toothless jaws and hollow limb bones.

Between the carnivorous and the bird-like dinosaurs a striking exhibit of fossil turtles, of two different ages, may be seen.

The gallery of fossil fishes and mammals is reached by passing through the archway leading from the reptiles. The first cases contain specimens of the earliest fishes known to science. By studying these exhibits one may trace our modern fish back through the ages to strange looking forms that lived three hundred million years ago.

Most of this gallery, however, is taken up with fossil mammals, that lived not long after the disappearance of the dinosaurs. As may be seen many of the early mammals are small. Among these earlier animals may be noted ancestors of the wolf, pig, rhinoceros, and camel, as well as many generalized archaic types.

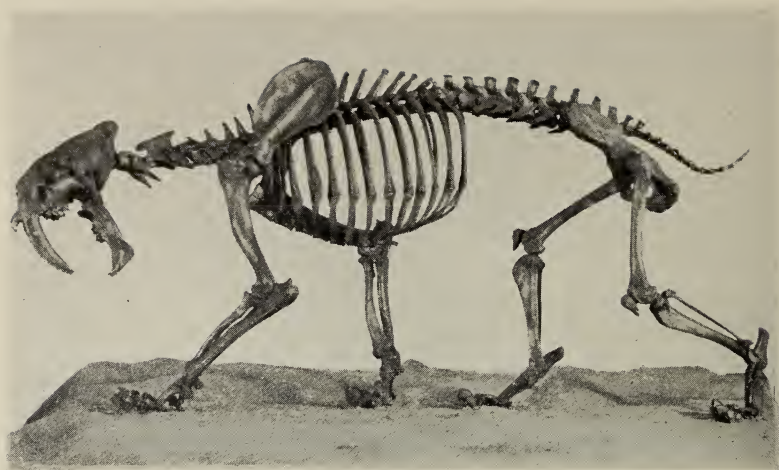
Then follow two fine horse skeletons from the later age of mam-



Duckbill Dinosaur



American Mastodon



Sabre-Tooth Tiger

mals. These were relatively small as compared with the modern horse, though their heads were larger, and their hoofs smaller. Nearby is the great hemispheric shell of a glyptodon, which is distantly related to the modern armadillo.

Farther along are the skeletons of the Irish elk and the mastodon, an elephant-like creature that lived in Ontario during the last million years. Tusks and teeth of the woolly mammoth, another of the extinct elephants, may be seen nearby.

Along with these recent mammalian fossils are the skeletons of two extinct birds. One, the moa, a large flightless bird that lived on into recent geological times in the New Zealand region was exterminated by the Maori; the other, the dodo, of similar age from the island of Mauritius, became extinct at the close of the seventeenth century.

There are the specimens of the fierce sabre-tooth tiger, wolves, and a ground sloth derived from the geologically recent asphaltic deposits of Southern California.

With the above mentioned birds, and with such animals as the Irish elk, mastodon, sabre-tooth tiger, and wolves, the immediate ancestors of our present day forms, palaeontological history ends and modern zoological history begins.

## ZOOLOGY

The animals we see about us are the end-products of a long lineage, recorded as fossils. Modern animals not only show the marks of that inheritance from the past; they display also many activities of practical and theoretical concern to man. Some of these aspects which are illustrated in the third floor galleries of the east wing are: geographical distribution, variation, adaptation, animals in the out-of-doors, economics, aesthetic enjoyment, and research. Most kinds of Canadian animals of great or moderate size are represented in the north gallery, while the south gallery contains a popular selection from many parts of the earth.

The geographic distribution of animals is well illustrated in the foreign gallery. Here many diverse animals originating in different parts of the globe may be seen and contrasted with the more familiar kinds to be seen in the Canadian gallery. Creatures such as the koala or "teddy-bear," the kangaroo and the duck-billed platypus of Australia, the armour-plated armadillos and giant ant-eater of South America, the strangely-patterned zebra, the grotesque and hideous mandrill baboon, and the big ostriches of Africa, the gorgeous birds-of-paradise and brilliant bird-wing butterflies from New Guinea, the rare giant panda and clumsy takin of China, the lustrous cowry shells and bizarrely-shaped corals from the Pacific, the fanciful flying fish from the Atlantic—all these look strange to our eyes because they have no close relatives in our land. There are others, however, which seem familiar to us. The bears, wolves, hawks, and gulls of Eurasia have their counterparts in Canada. They are related animals.

The specimens displayed in the foreign and Canadian galleries show such a wealth of variation in form and colour that this, in fact, may be the chief impression gained during a brief inspection. In the Canadian gallery for example the tiny pygmy shrew is placed in the same case with the towering moose—both possess the same general type of skeletal structure, yet one weighs a tenth of an ounce, the other well over half a ton! Again, compare the alert, agile deer with the bulky bear or slow burrowing mole. The thoughtful visitor may well ask—how did animals become so different?—the answer is best illustrated by an analogy. Nature, like an animal breeder, has eliminated some of the countless variations that occur among animals and has perpetuated others.

The exhibit of different breeds of dogs in the Canadian gallery





Screech Owls, Realistic Mounts from the Extensive Series of Canadian Birds



Capercaillie, a Giant Grouse from  
Northern Europe



Common Chimpanzee, Most Man-Like  
of the Apes



Giant Panda, a Rare, Bear-Like Mammal from Western China

In the gallery of foreign animals, specimens of both familiar and little-known creatures are displayed.

will illustrate the wide range of differences that can result from careful selection of breeding stock. The Indian sled-dog and dingo are closest to the original wild type of dog. From similar animals man has produced such distinctive breeds as the Brussels griffon, great Dane, wolfhound, English bulldog, chow-chow, and collie.

It is not enough to consider the varying forms of animals. It is necessary to see what these differences mean in terms of their everyday life. In one exhibit woodpeckers are shown at work on a stump. Diagrams demonstrate how the woodpecker's feet and tail are suited for clinging to the vertical trunk while the chisel-like bill chips away the decaying wood and exposes the insect larvae which are speared and drawn out by the harpoon-like tongue. While this one exhibit specifically illustrates adaptation, many other examples may be gleaned from the galleries—the spade-like feet of the mole for digging,



Woodland Caribou, One of the Vanishing Large Mammals, from the Museum's Complete Collection of Canadian Deer





Doberman-Pinscher, from the Series of Champion and Purebred Dogs  
in the Exhibit Dealing with Artificial Selection

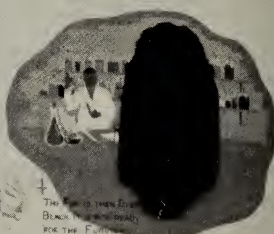
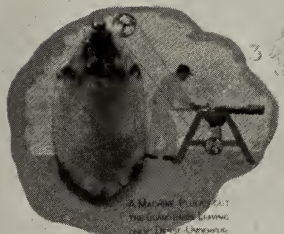
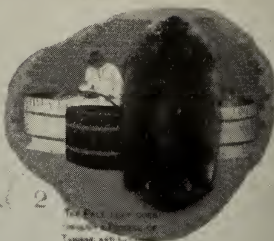
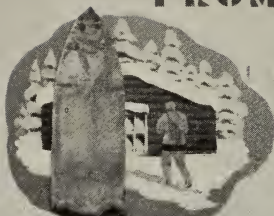
the stream-line form of many fishes for rapid swimming, the powerful hind-legs of the grasshopper for jumping, etc.

Other exhibits demonstrate that each creature is an integral part of its environment; the speckled trout in foaming rapid water; the Blanding's turtle and its egg-burrow on a sandy beach; the black bear in a burnt-over area where blueberries abound. One exhibit of this type deals with the extinct passenger pigeon and preserves a bygone scene of Ontario animal life. The principal actors—the passenger pigeons—have departed forever.

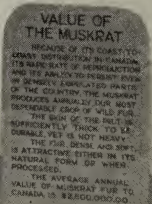
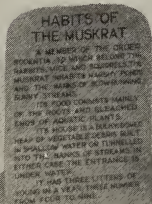
For many different animals inhabiting any one area, food provides a common link. This point is graphically illustrated in a novel fashion under the title "Nature's House that Jack Built." Here is shown the hawk that eats the snake, that eats the frog, that eats the grasshopper, that eats the grass. At the same time two general principles con-



# FROM MUSKRAT



## TO HUDSON SEAL



From Muskrat to Hudson Seal, an Economic Exhibit  
Telling the Story of a Fur Coat

# HOUSEFLY

## HOW IT TRANSMITS DISEASE



Head of pig  
(fly on snout)



Flies have been  
proven to carry  
disease germs  
from one place  
to another



Mugget

**FEEDING HABITS**  
Houseflies feed on living and dead matter. They are found in great numbers in places where food is left out. They are especially fond of manure, garbage, and decaying food. They are also found in places where food is left out, such as in the kitchen, the dining room, and the bedroom. They are also found in places where food is left out, such as in the kitchen, the dining room, and the bedroom.



**LIFE HISTORY**  
The housefly has a life history of about 14 days. It begins its life as an egg, which is laid by the female fly. The egg hatches into a larva, which grows into a pupa, and finally into an adult fly. The adult fly lives for about 14 days. During this time, it feeds on living and dead matter, and it lays eggs. The eggs hatch into larvae, which grow into pupae, and finally into adult flies. The adult flies then lay more eggs, and the cycle begins again.



Flies carry germs  
from one place  
to another

Pupa



House Fly; Enlarged Models Tell the Story of Its Unwholesome Relations to Man

tingent on food are illustrated: that there must be many more food animals than predators, for example, more snakes than hawks, more frogs than snakes, etc.; and also, that the populations of all animals are held in check either by some other animal or by other causes, of which disease is a good example. The latter agent probably explains the periodic and sudden decline in numbers of the snowshoe rabbit, a common Canadian mammal which has been made the subject of a special exhibit.

The numerical fluctuations of wild mice and rabbits are economically important since these small mammals determine the numbers of valuable fur-bearing foxes and lynxes which feed on them. Furs are the subject of two special exhibits. Muskrat pelts are shown against a colourful background and traced through the various steps in processing from trap to Hudson Seal coat. Nearby there is a tribute to the beaver, the emblem of Canada, and the major factor in shaping the early development of our country.

Man, like other animals, needs food. To Canadians, the animals of the seas and lakes are important as is suggested by an attractive panel which records the fact that the average yearly value of fisheries products to Canada is about \$40 million. Not only food but also recreational value is provided by Ontario game animals, as exemplified in an adjacent alcove.

The human food supply is greatly curtailed through the activities of various pests. Of these, some are of great concern to Canadians and for that reason are presented in the form of carefully constructed models, enlarged fifty diameters. Included in this exhibit are the grasshopper, house fly, and others.

The destructive work of certain garden and forest insects is also depicted. The parasitic worms, portrayed in another case by means of models, are also harmful to man and his domesticated animals.

The practical considerations are, perhaps, outweighed by the aesthetic qualities of animals and their influence on the arts of man, primitive and civilized. The beauty of form and wealth of colour displayed in the galleries provide an emotional appeal and a stimulus to curiosity. In addition to the permanent exhibits, two other installations help to inspire an appreciation of wild life. One, a handsome octagonal aquarium, features changing exhibits of living Canadian and foreign fishes, reptiles, and amphibians. The other, a specially





Mountain Lion (above), and Grizzly Bear, Excellent Examples of Modern Sculpture-Taxidermy Displayed in the Gallery of Canadian Animals

illuminated art alcove is devoted to seasonal features, hangings of nature photographs and paintings, books, and other related topics.

The preparation of material for zoological galleries is a highly technical work. No longer are animals "stuffed," instead they are mounted by technicians who must be a combination of sculptor and naturalist. For example, the fine, large series of Canadian fishes is made up of casts in plaster, celluloid, and wax, so skilfully prepared and painted that they present a better impression of the living fish than would preserved specimens. Different general technique is employed in case of mammals and birds. Here a sculptured form is made in accurate imitation of the animal's body. This is light, strong and not subject to extensive shrinkage or warping. Over this manikin the skin is fitted and sewn. Finally, faded fleshy parts are tinted to represent the colour of the living animal. The result is satisfying, both scientifically and artistically.

In the storage rooms are carefully constructed dust and vermin proof cabinets which permanently house thousands of study specimens representing many different kinds of Canadian animals. In addition, the Museum has large files of related information garnered from scattered sources. These classified specimens along with filed information and books are used in two ways: to identify samples of animals submitted by biologists, wildlife officials, fisheries investigators, naturalists, and members of the general public; to serve as a basis of research by the Museum staff or by scientific investigators of institutions elsewhere. From such study comes the information disseminated by the Museum through its popular and scientific publications and the medium of its galleries.

### III. THE ARTS OF MAN

**T**HOUGH birds, wasps, and many other animals construct complicated nests, man alone makes tools and uses them to produce further articles, a process which is the basis of the complex manufacturing life of today. It is this ability which has enabled man, who is physically weak, to reach his predominant position in the world. The study of his creations, which is vital to the understanding of human development, has no parallel either in the study of the earth or in that of other forms of life.

The first implements were probably pieces of wood or stone of convenient shape, the possibilities of which were recognized by the subhuman ancestors of man, but it was not until within the Pleistocene epoch, possibly five hundred thousand years ago, that pieces of flint were first chipped to regular patterns. These were the first manufactured tools.

These crude unpolished stone implements are well represented in the prehistoric gallery on the second floor. They were made in Europe, Africa, and Asia, but their sequence is best known from Western Europe. The New World and the Pacific Islands were uninhabited by man at that time. About the close of the last Ice Age man learned the technique of polishing stone implements, thereby introducing the era of polished stone, the Neolithic Age. Man spread to all parts of the world carrying with him this knowledge, and the development of human industry has taken place in every continent. It is impossible, therefore, to illustrate a direct sequence in the development of human craftsmanship. Different industries grew up in different parts of the world at the same time, presenting a complex picture of spreading ideas and of independent growth. Such is the warp and woof of human culture, the intricate picture presented in the cross bars of the Museum and the galleries of the west wing.

The central prehistoric gallery on the second floor shows not only the first unpolished tools of man, but contains fine collections, probably



King's Head with Hieroglyphic Inscription, Limestone Relief Sculpture, Egyptian, about 1900 B.C.



Winged Lion of Glazed Earthenware Bricks, from Babylon, c. 1900 B.C.



the best in America, of the European Neolithic and Bronze Ages, with a series of murals to suggest the use of the articles shown. From here radiate the galleries of ancient Egypt and Mesopotamia, Greece and Italy, each linked more or less closely with European prehistoric culture. Five galleries of Egyptian and one of Mesopotamian material show the gradual growth of intensive agriculture and specialized industry out of the Neolithic Age in two highly organized centres of civilization. About 3000 B.C. in each of these areas copper and bronze tools and a standardized system of writing were used for the first time, so far as is known, in the history of mankind. We see the actual tools and products of the farmer, the builder, the potter, and the metal-worker—craftsmen whose arts can be traced through successive ages until today. The development of writing is well illustrated from its picture origins to a complex standardized system. Mural art and sculpture in the round give a hint of the artistic genius of these peoples over a period of more than three thousand years, and a frieze, in Egyptian style, depicts the use of articles shown in the cases beneath it. The Egyptian mummies, a unique attempt to perpetuate physical life by complicated embalming and ritual, are of popular interest.

The cross-bar of the second floor contains five galleries of material from Greek lands and one from early Italy. Gems and metal work and vases give some hint of the brilliance of the Bronze Age in the Aegean and their evidence is supplemented by a reconstruction of a scene in the Palace of Minos at Knossos (sixteenth century B.C.). Iron appeared in the Aegean world toward the end of the second millenium B.C., a period of turmoil and lowered cultural levels which are well illustrated by the weapons and vases in the galleries. From this "Dark Age" emerged the Classical Greek civilization and art. In an ample series of painted vases one may trace the development of Greek painting, and at the same time learn much of the dress, the sports, the mythology, and the religious beliefs of the period. The student of sculpture will find a few marbles and bronzes and many more informal documents in the shape of terracotta figurines intended for the home, the tomb, and the temple. Growing commerce led to the invention of coinage (seventh century B.C.); the coins themselves are often exquisite bits of sculpture.

Galleries 11 to 14 on the second floor are given to the Roman world. Here one is brought face to face with the Romans themselves in a series of marble heads and busts and painted portraits. The same



Black-Figured Amphora from Athens, Greek, Sixth Century B.C.

galleries contain a large collection of Roman costumes, farm implements, carpenters' tools, weapons, children's playthings, writing materials, in fact the whole paraphernalia of everyday life in such completeness and profusion as to make the picture clear with a minimum of words. Such evidence is especially welcome in the case of the four centuries of Roman domination in Britain for which practically no literary records exist.

Many of the Roman home crafts, the agricultural implements, the costumes, and even the types of coins, have continued in use in Palestine until a generation ago. These are shown in gallery 14, and serve to illustrate objects and crafts described in the Bible.

The remaining galleries in the south end of the west wing are occupied by the textile and costume collections. Off the central prehistoric section is a gallery containing eighteenth and nineteenth century costumes selected from the Museum's extensive collection, and a series of woven fabrics which illustrates the history of silk weaving in Europe. Next come the collections of European lace and embroideries and then a small gallery with some superb examples of textiles from Eastern Europe. At the extreme south end of the wing is a gallery where changing exhibits from the Harry Wearne collection of painted and printed fabrics are displayed. It is particularly noted for a wonderful series of hand-painted and resist-dyed cottons from India. These are the ancestors of our gay modern chintzes and were



Silver Tetradrachm of Mithradates VI, King of Pontus and Bosphorus  
(120-63 B.C.)

almost as important as spices in the traffic of the East India Companies between Europe and India during the seventeenth and eighteenth centuries. Made in India for the European market they show an interesting blend of east and west in their designs.

The main floor is almost entirely given up to the arts and crafts of Europe. In the cross-bar immediately opposite the doorway is the collection of arms and armour. Beginning with Viking swords near the doorway, case after case shows the development in Europe of the sword, the shield, and, better known in words than in reality, armour. Much of European history is illustrated in this room. Here are the elaborate suits of the Spanish dons of the period of the Armada; there are the claymore and the targe of the Highlander; yonder are the crude peasant weapons of the seventeenth century, so rough in comparison with the fine armour of their lords; nearby are the beautifully engraved



Set of Carpenter's Tools, Roman Period





Court Dress of Spitalfields Silk, English, Late Eighteenth Century



Painted and Resist-Dyed Cotton, Indian, Mid-Nineteenth Century  
(Harry Wearne Collection)

German gunlocks of the seventeenth century. This gallery illustrates one aspect of European history, namely, the arts of war.

In the arts of peace in Europe, the Museum offers to designer and student alike the benefit of reference to the finest attainments of the past to use for the benefit of the future. Collections including furniture, woodwork and sculpture, metalwork, glass, pottery and porcelain, from the Gothic and Renaissance periods to the present day, are in the west wing on this floor. The complete progression of design through these periods is shown in detail in the five galleries and three period rooms representing English arts, while characteristic specimens of the periods are shown in one gallery each devoted to Italy, Spain, France, and the Low Countries. In addition there are the R. S. Williams collection of musical instruments, and a collection of manuscripts and early printing. Outstanding exhibits are the choir woodwork of an Italian Franciscan church, a French-Canadian pine-panelled room with contemporary furniture, and the Sigmund Samuel gallery of Canadian historical prints. The Museum continues to acquire examples of fine modern craftsmanship from time to time. Exhibits of this kind are particularly valuable, as it has now become possible to raise the whole standard of modern mass-produced objects by improving the quality of the designs. On the main floor there are also two Chinese galleries, which are separated from the bulk of the Chinese collection on the third floor on account of difficulties of installation. One of these contains an elaborate stone tomb of the Ming Dynasty, and the other three superb thirteenth century temple frescoes.

Although European peoples have excelled all others in their mechanical achievements and have attained a high place in most of the fine arts as well, the arts and crafts of Europe are, after all, only a small part of the industries of mankind. Four massive totem poles (the tallest is 82 feet 6 inches), occupy the wells of the main stairway, rising from the ground floor where are shown the arts and crafts of aboriginal America, Africa, and the Pacific Islands. Here, too, the arrangement is geographical. The totem poles of British Columbia are the point of departure for these galleries. The first is of the north-west coast where life centred upon fish for food, and wood for utensils; in the next are shown the beautiful baskets and other crafts of the acorn-eating Indians of California. On the walls of this gallery there is also a large collection of paintings by Paul Kane which





Cap-à-Pie Suit of Armour, Italian,  
1500-1530

illustrate Indian life in the middle of the last century, from the Great Lakes to the Pacific. The last room in the cross-bar contains material from the Plains, characterized by decorated costume and other articles of skin.

Passing into the western wing of the building, the left (southern) section leads through the Ontario exhibits to those of the Eskimo. As a Canadian institution, the Museum has a special responsibility for preserving the works of the Indians. They played a significant part in Canadian history; indeed, we owe to them such elements in our own life as corn, tobacco, and canoes. But to understand the Indians, we must understand their life, and this can only be done through the medium of collections of their tools, their clothing, their weapons, and their household objects. The collections from Ontario include thousands of stone tools, elaborate stone ceremonial objects, pottery, bone,





Painted Stone Madonna and Child, French, about 1340



Mahogany Sideboard Group, English, Late Eighteenth Century  
(Burnside Collection)

and shell-work from pre-European sites, as well as baskets, clothing, clubs, and other perishable articles made after the coming of the white man. The Eskimo collections similarly include older articles of stone, bone, horn, and ivory, as well as fur clothing and household articles of the last generation.

In the right (northern) section of the west wing, the first gallery contains a large collection of pottery from New Mexico, partly excavated from early sites; but with many cases of the superb hand-made vessels of the nineteenth century. The higher civilization of Mexico is well represented by a large collection of eleventh century Zapotec pottery, and a smaller gallery beyond contains Peruvian material, including examples of the fine weaving of that area, and a few specimens of the gold and silver which lured the Spaniards.

Beyond the Indian galleries are those of Africa, Indonesia, and the Pacific Islands. The African collections show clearly the skill in



Iroquois False Face Society Mask,  
Painted Wood, North American Indian

iron working characteristic of that area, as well as examples of sculpture and of weaving. In contrast, the natives of the south Pacific have specialized in wood, with a precision of line and of symmetry found in few other parts of the world. Taken as a whole, this floor shows the diversity and proficiency of human craftsmanship among peoples generally considered primitive.

The Museum's important East Asiatic collection is housed in the west wing and most of the cross-bar of the top floor. The galleries are arranged in historical sequence, so that beginning with room 1 from the rotunda, and bearing to the right, a visitor moves down through thirty-four centuries of Chinese history as he passes through the sixteen galleries of the Chinese collection.

The bronze of the Shang Dynasty (1765-1122 B.C.) has never been equalled for beauty of design and perfection of technique. The collection contains numerous specimens of these famous bronzes, together with pottery, jade, and carved bone and ivory of this early period. The gallery of the classical Age (770-256 B.C.) contains a unique exhibit of objects from a Loyang tomb, dating to the time of Confucius. In it there are bronzes with gold and silver and turquoise inlay, many bronze mechanical devices, carved jade, glass beads with Egyptian "eye" designs, stone chimes and sets of bells, and many other objects which reveal that a very high standard of culture existed in the fifth century B.C.

Hunting and nomadic scenes are depicted on massive tomb tiles of the third century B.C. The glazed pottery vases and models of Han (206 B.C. to A.D. 221), the clay figurines of Wei (third to fifth centuries), the polychrome glazed horses and camels and tomb guardians of T'ang (618-907) the chaste and exquisite porcelains of Sung (960-1280), the grandeur of the palace roof-ornaments and porcelain glazes of Ming (1368-1644) and the exuberance of form and colour and material of objects of the Ch'ing (1644-1911), altogether reveal a sweep of the glory of Chinese culture which stirs the imagination.

The Japanese collection occupies four galleries, one being devoted to paintings, screens and bronzes, another to arms and armour, including swords of superb steel, a third to block-prints, and a fourth to pottery, porcelain, and lacquer. Then follows a gallery of Mohammedan art, with objects from Iran, Turkey, Egypt, and other parts of the Islamic world. Next is the East Indian collection, which—



although small—contains some of the finest known specimens, and also includes objects from Tibet, Nepal, Burma, Thailand, and Cambodia.

The public galleries contain the bulk of the display material but special study facilities are available to students in several departments. At the south end of the Chinese section is the Sigmund Samuel gallery which contains the only Chinese library at present in Canada.

On the floor below is a textile study room, with large collections of material used extensively by art students and technical designers. In association with the Ontario Indian gallery on the ground floor is a study room with thousands of archaeological specimens from Ontario, and near it is a ceramic and glass study room, equipped for the study of pottery, porcelain, and glass of various countries and periods.

The development of human culture is really the history of mankind. Many volumes would be needed to describe what is shown in these galleries, and the objects themselves speak more convincingly than



Painted Earthenware Pot, Ancient  
Peruvian, Nazca Culture



Wooden Head Covered with Skin, African, from Calabar Nigeria



Inscribed Bronze Ceremonial Vessel, Chinese, Later Shang Dynasty  
(1400-1200 B.C.)

words. To understand mankind, one must know mankind; here is shown what has been accomplished through the centuries in different parts of the world.

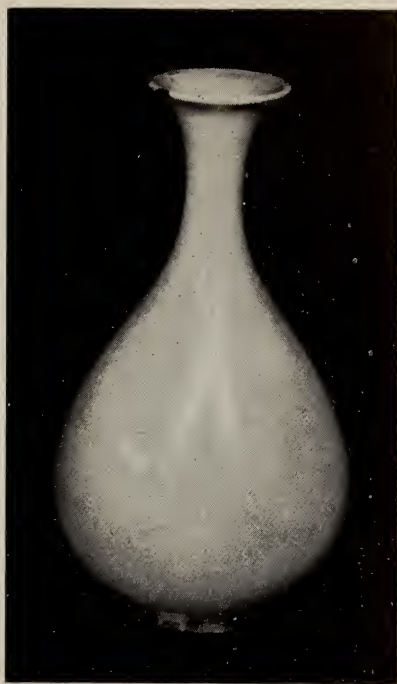
The Royal Ontario Museum has the advantage of being both a provincial and a University institution. It is administered by a Board of Trustees, appointed in part by the Province of Ontario, and in part by the University of Toronto. The senior officers usually hold teaching positions in the University and their services to the Museum are largely on a voluntary basis.

Within the one building, the Royal Ontario Museum, there are four independent Museums, the Royal Ontario Museums of Archaeology, of Geology and Mineralogy, of Palaeontology, and of Zoology, each with its own staff and each responsible to a common Board of Trustees. Each Museum is entirely independent in regard to research



Earthenware Horse, Painted and Gilded, Chinese, T'ang Dynasty  
(A.D. 618-907)





Porcelain Vase, Chinese, Sung Dynasty  
(A.D. 960-1280)

work and the acquisition and installation of material; all Museums work together in activities which concern the Museum as a whole.

The Division of Museum Extension is responsible for developing and coordinating educational work with adults and with Ontario schools. Members of the staff of this Division tour the province from time to time, lecturing to school classes and adult groups and exhibiting objects from the collections. Many thousands of school children from all parts of Ontario come to the Museum on special excursions from various districts; they spend a day in the Museum and are taken in organized groups to see the objects about which they have been studying in school. On Saturday mornings and during the summer, the Division of Museum Extension conducts project classes for children based on material in the galleries. The Museum has a well equipped theatre which is used by members of the Museum



Bodhisattva of Lacquered Wood, Japanese,  
Fujiwara Period (A.D. 898-1185)

staff for public lectures and for the showing of educational films connected with Museum material and other educational activities. It may be rented by organizations of an educational nature. Several lecture rooms are used by University classes whose studies are related to Museum exhibits, as well as by members of the Division of Museum Extension preparatory to taking school classes or adult groups into the galleries.

The Museum is a public institution, therefore it strives to make its exhibits available to as wide a number of visitors as possible. Between the opening of the building in 1914 and April, 1945, five million visitors have come through the turnstiles, and 3,393,530 of these since the enlargement in 1933. The Board of Education of the City of Toronto employs a full time teacher to conduct seventh and eighth grade classes through the galleries, the subjects being chosen in conjunction with the school curriculum. Art schools send their students regularly to



Bronze Siva as Nataraja, Indian, probably Twelfth Century





Teaching with Objects



sketch in the galleries and to use the Museum's study facilities. High schools, private schools, and suburban schools make use of the services of the Division of Museum Extension. By means of publications, including a monthly news release, the resources of the Museum are made available to those who cannot come to the building itself. Nothing can take the place, however, of an actual visit, and every care has been taken to make such a visit pleasant as well as instructive. The Museum is a well-designed modern building, with adequate facilities, including an attractive tea-room. It is a centre for visual education, providing profitable recreation and a stimulus to learning.





